

ABSTRACT

The invention provides systems, including apparatus, methods, and kits, for the

5 microfluidic manipulation and/or detection of particles, such as cells and/or beads. The invention provides systems, including apparatus, methods, and kits, for the microfluidic manipulation and/or analysis of particles, such as cells, viruses, organelles, beads, and/or vesicles. The invention also provides microfluidic mechanisms for carrying out these manipulations and analyses. These mechanisms may enable controlled input,

10 movement/positioning, retention/localization, treatment, measurement, release, and/or output of particles. Furthermore, these mechanisms may be combined in any suitable order and/or employed for any suitable number of times within a system. Accordingly, these combinations may allow particles to be sorted, cultured, mixed, treated, and/or assayed, among others, as single particles, mixed groups of particles, arrays of particles, heterogeneous particle sets,

15 and/or homogeneous particle sets, among others, in series and/or in parallel. In addition, these combinations may enable microfluidic systems to be reused. Furthermore, these combinations may allow the response of particles to treatment to be measured on a shorter time scale than was previously possible. Therefore, systems of the invention may allow a broad range of cell and particle assays, such as drug screens, cell characterizations, research studies, and/or

20 clinical analyses, among others, to be scaled down to microfluidic size. Such scaled-down assays may use less sample and reagent, may be less labor intensive, and/or may be more informative than comparable macrofluidic assays.

PA 3295576 v1